Electronic Supplementary Material (ESI) for CrystEngComm.


**Supporting Information**

# Room-temperature Synthesis of Ag- and Mn-Doped $Cs_2NaBiCl_6$ Octahedrons for Dye Photodegradation

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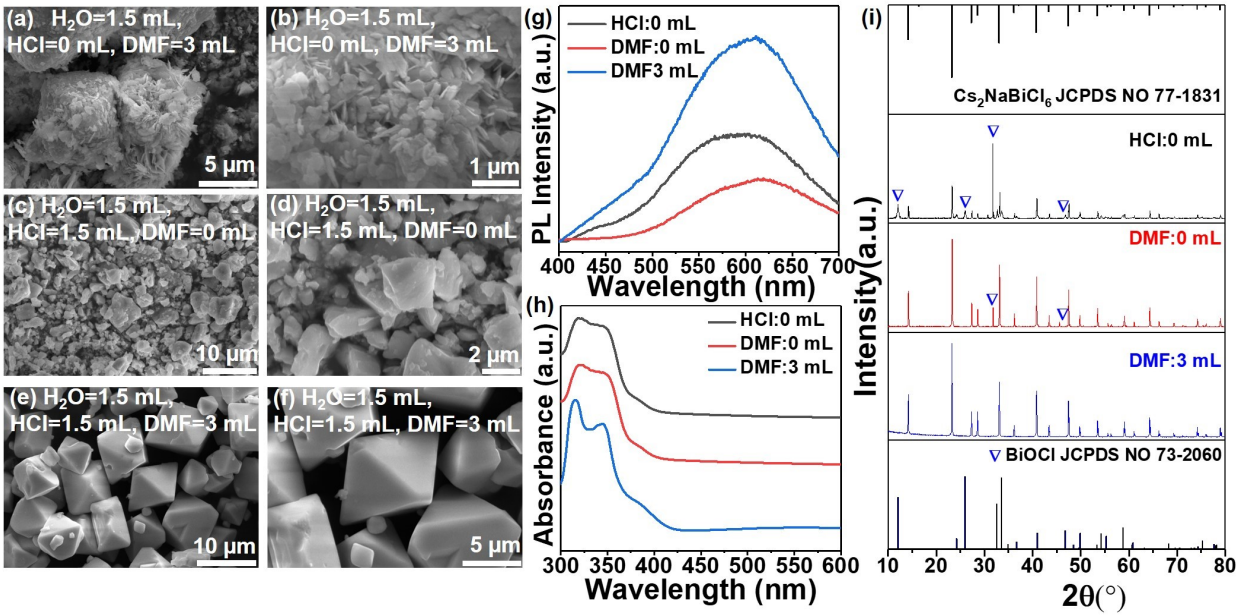


**Fig. S1** (a-f) SEM images of various samples synthesized in the presence of different solvent as dictated. (g-i) PL spectra (g), UV-visible diffuse reflectance spectra (h), and XRD patterns of the corresponding samples.

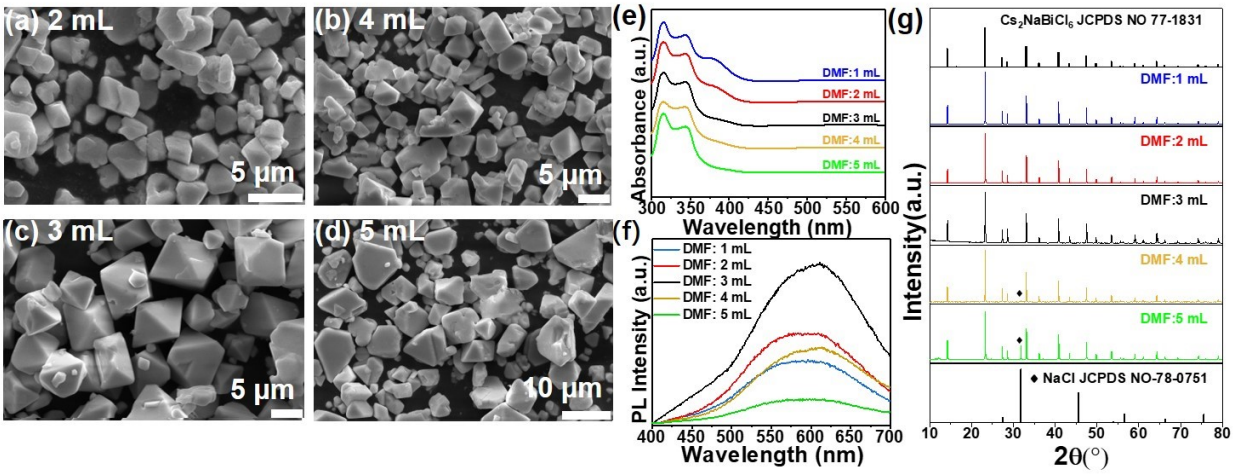


**Fig. S2** SEM images (a-d), PL spectra (e), UV-visible diffuse reflectance spectra (f), and XRD patterns (g) of the samples synthesized in the presence of different amounts of DMF as dictated in each panel.

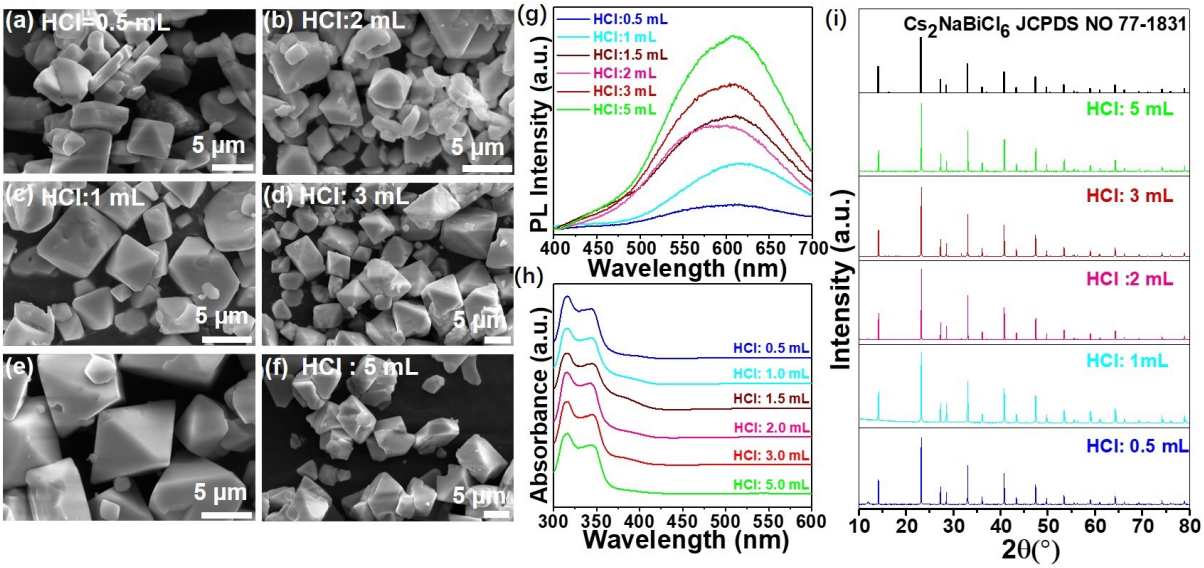


**Fig. S3** SEM images (a-f), PL spectra (g), UV-visible diffuse reflectance spectra (h), and XRD patterns (i) of the samples synthesized in the presence of different amounts of HCl as dictated in each panel.

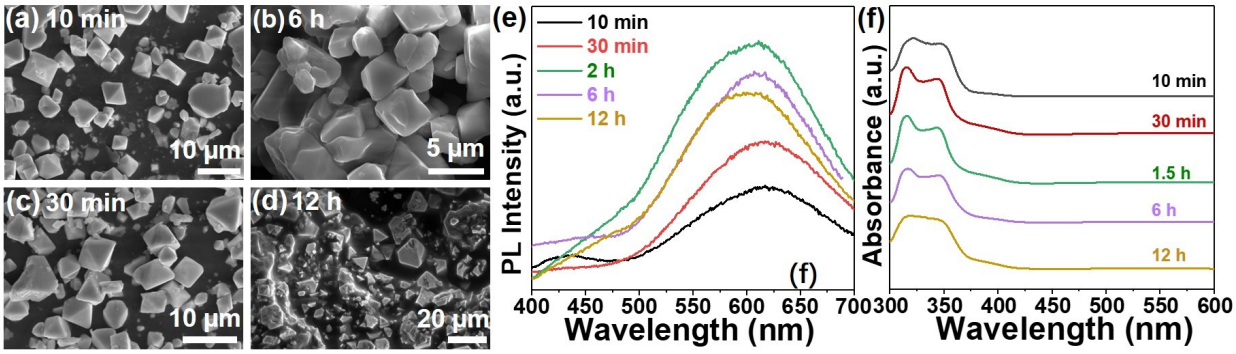


**Fig. S4** SEM images (a-d), PL spectra (e), UV-visible diffuse reflectance spectra (f) of the samples collected at different reaction time as dictated in each panel.

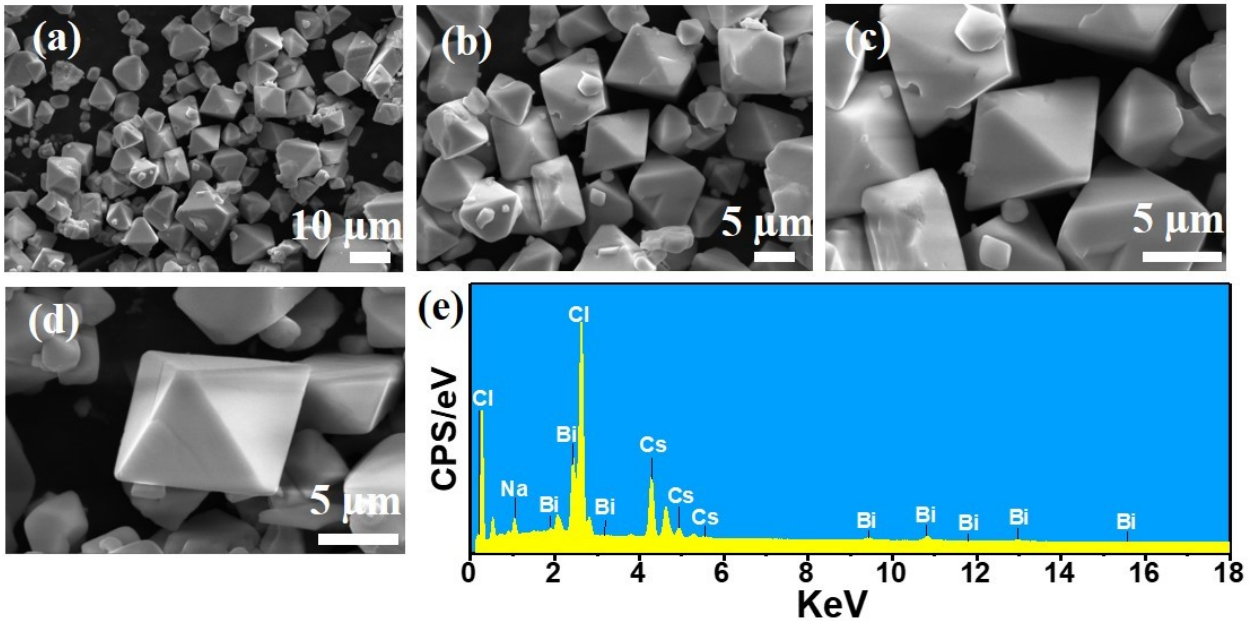


**Fig. S5** SEM images with different magnifications (a-d), and EDS spectrum (e) of the representative $Cs_2NaBiCl_6$ sample as-synthesized in the presence of 1.5 mL HCl, 3 mL dimethylformamide, and 1.5 mL distilled water.

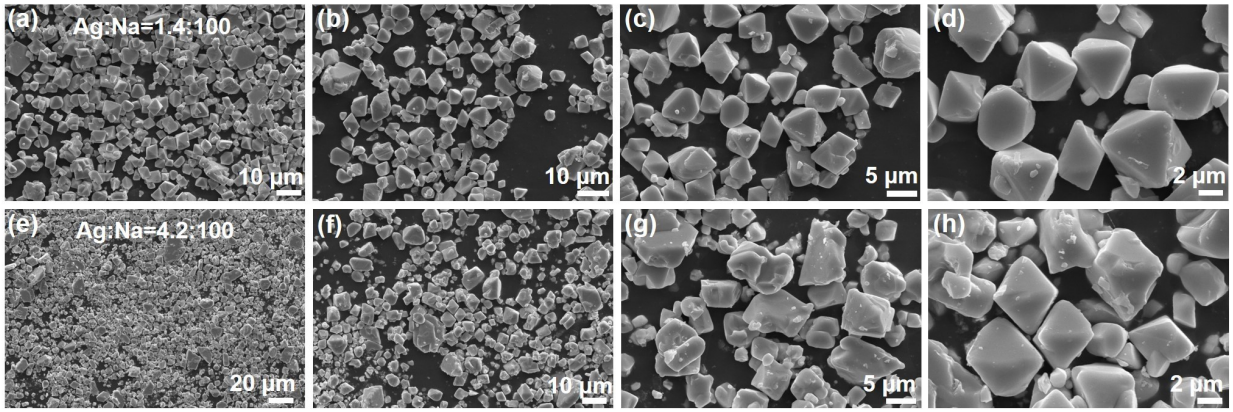


**Fig. S6** FESEM images of the various samples achieved with Ag:Na precursor molar ratios of 1.4:100 (a-d) and 4.2:100 (e-h), respectively.

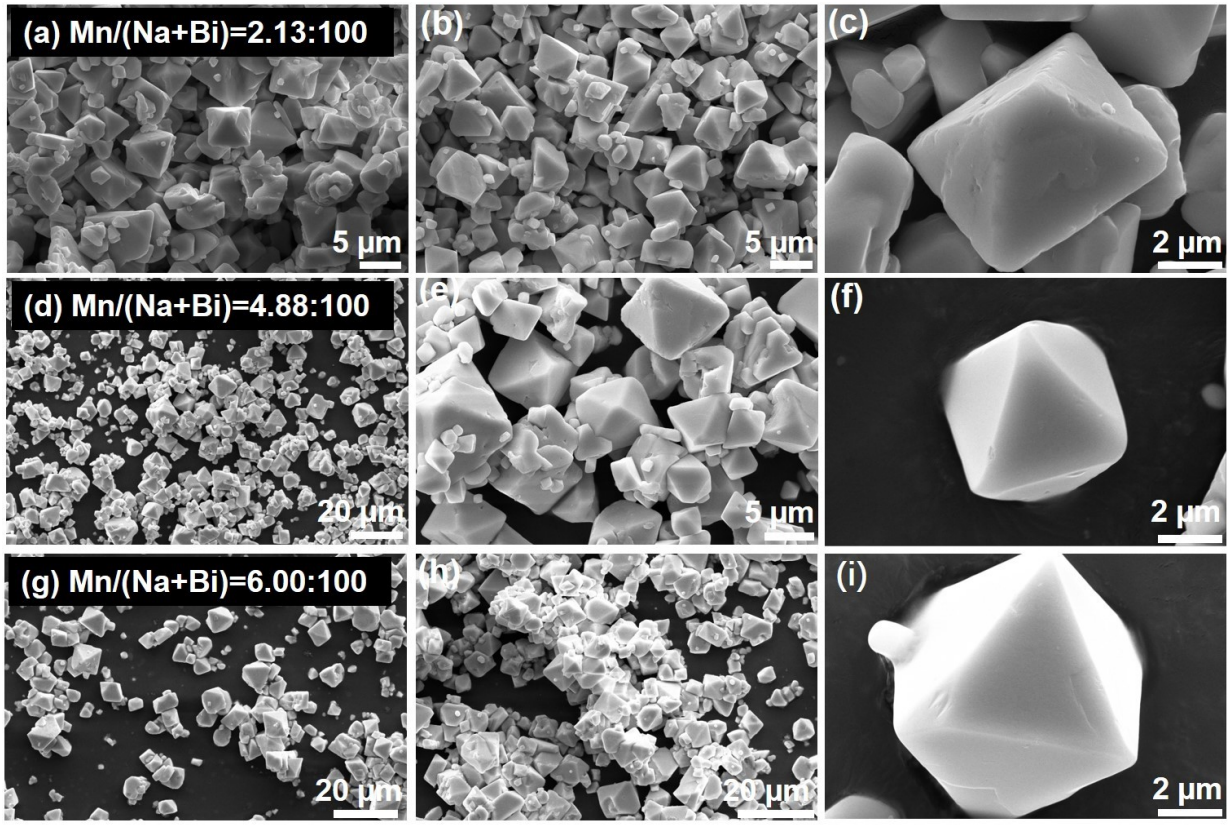


**Fig. S7** FESEM images of the Mn-doped CNBC samples achieved in the presence of Mn:(Na+Bi) precursor molar ratios of 2.13:100 (a-c), 4.88:100 (d-f) and 6.00:100 (g-i), respectively.

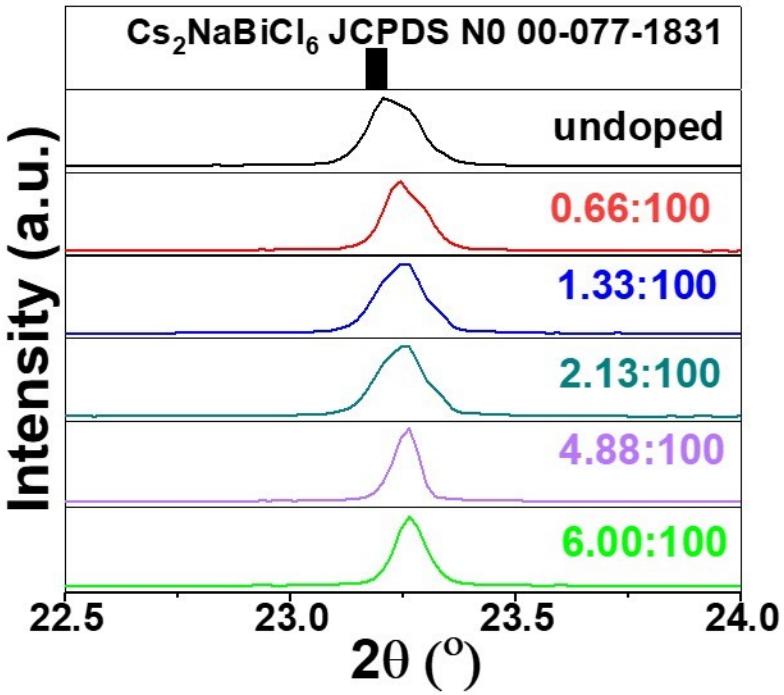


**Fig. S8** XRD patterns (d) of the Mn-doped CNBC samples achieved in the presence of different Mn:(Na+Bi) precursor molar ratios.

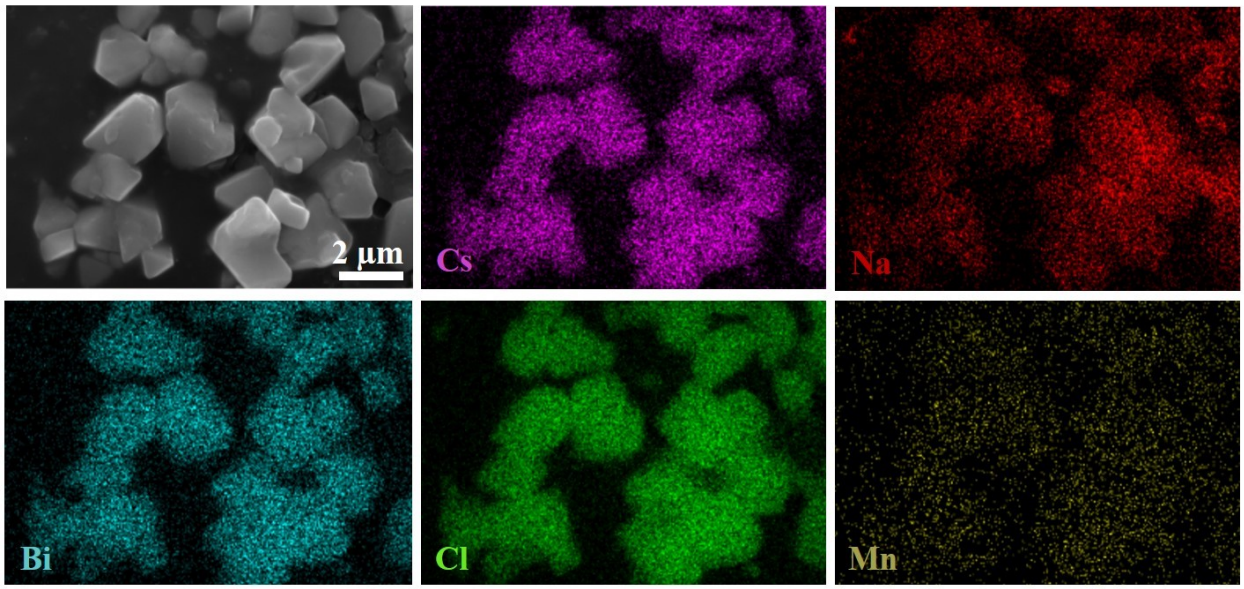


**Fig. S9** Elemental mapping of the representative Mn-doped CNBC sample.

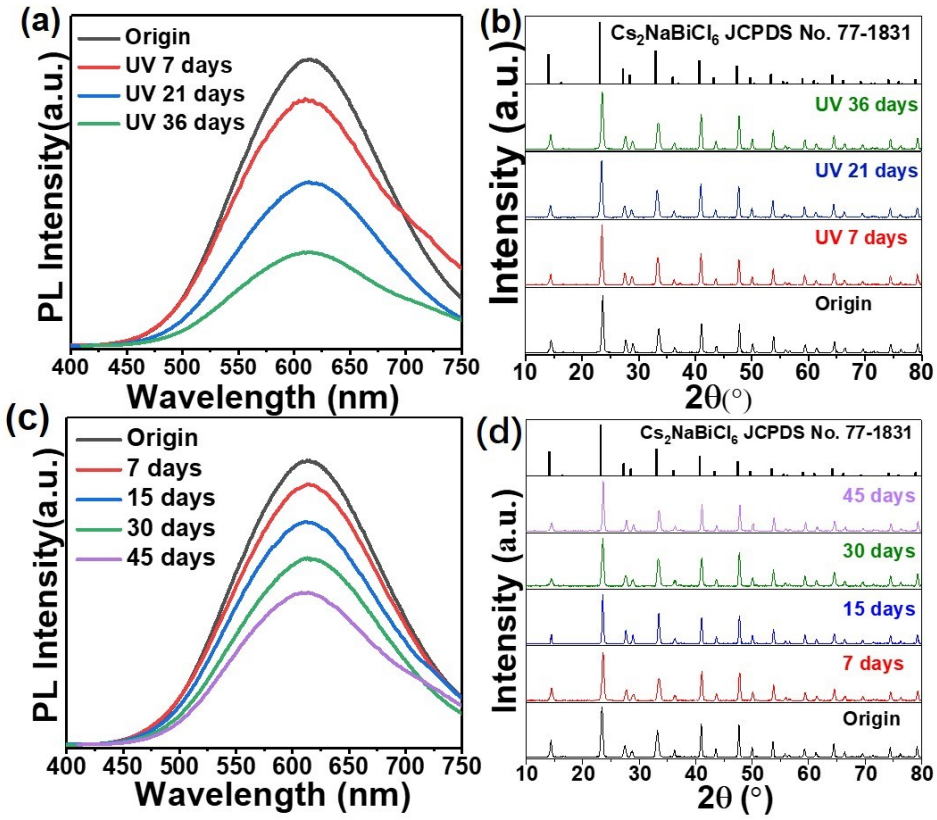


**Fig. S10** Stability analyses of the representative Ag-doped CNBC octahedrons. (a-b) Evolution of PL spectra (a) and XRD patterns (b) over time under UV irradiation. (c-d) Evolution of PL spectra (c) and XRD patterns (d) over time under ambient condition.

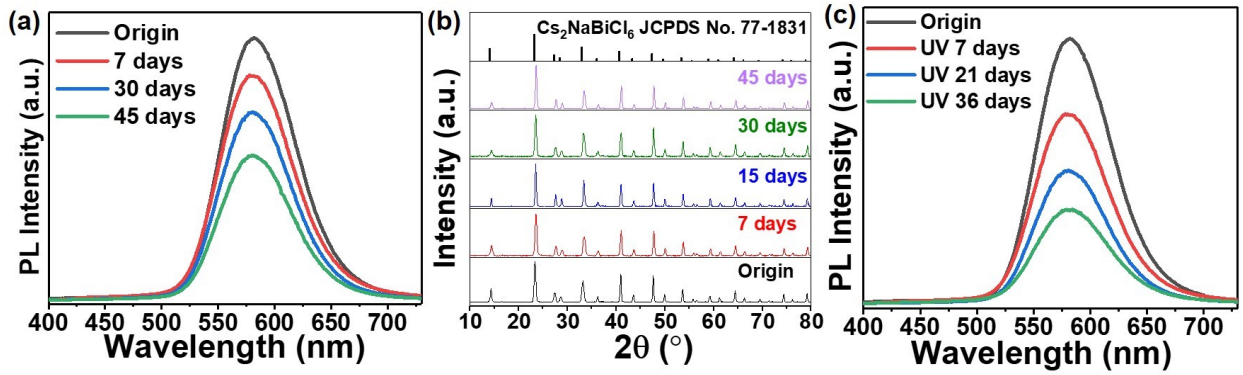


**Fig. S11** Stability analyses of the representative Mn-doped CNBC octahedrons. (a-b) Evolution of PL spectra (a) and XRD patterns (b) over time under UV irradiation. (c) Evolution of PL spectra over time under ambient condition.

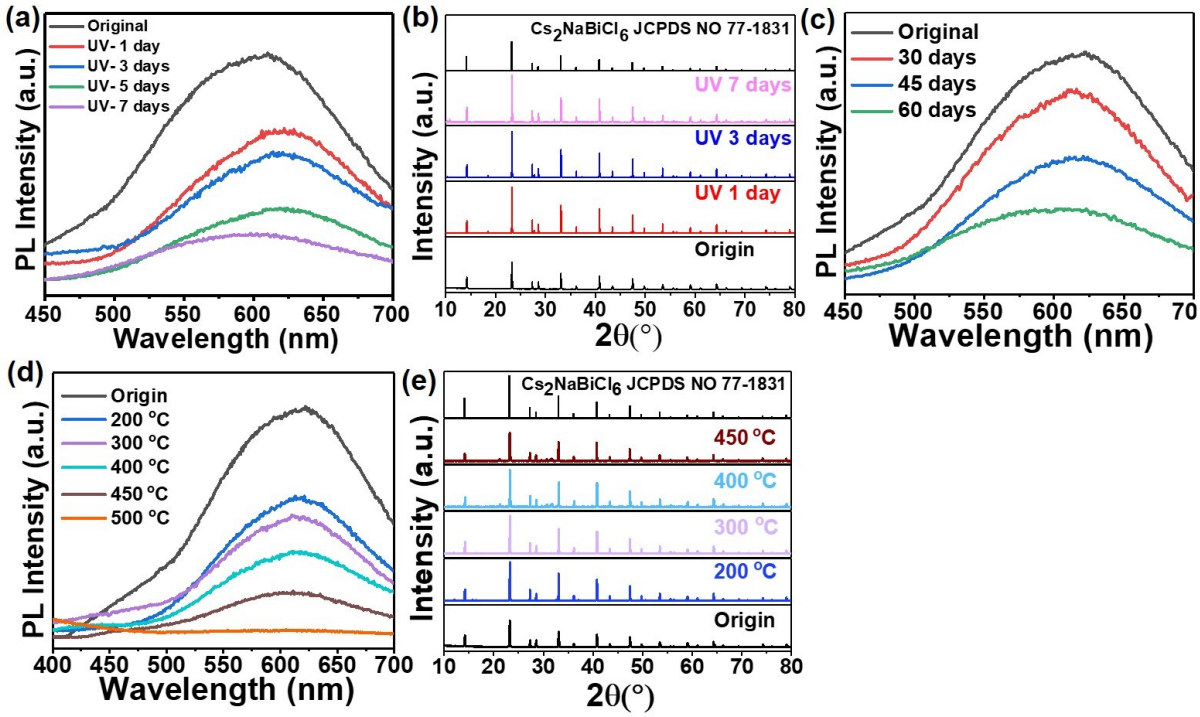


**Fig. S12** Stability analyses of the undoped CNBC octahedrons. (a-b) Evolution of PL spectra (a) and XRD patterns (b) over time under UV irradiation. (c) Evolution of PL spectra over time under ambient condition. (d-e) Evolution of PL spectra (d) and XRD patterns (e) over annealing temperature for 2 h.

**Table S1** The percents of the PL intensity compared with the original PL intensity of the various samples under different conditions.

| Samples | UV irradiation for 7 days | 45 days under ambient environment | Annealing at 300$^{o}$C for 2 h |
|---|---|---|---|
| Undoped CNBC | 22% | 54% | 53% |
| Ag-doped CNBC | 85% | 60% | 54% |
| Mn-doped CNBC | 71% | 55% | 74% |

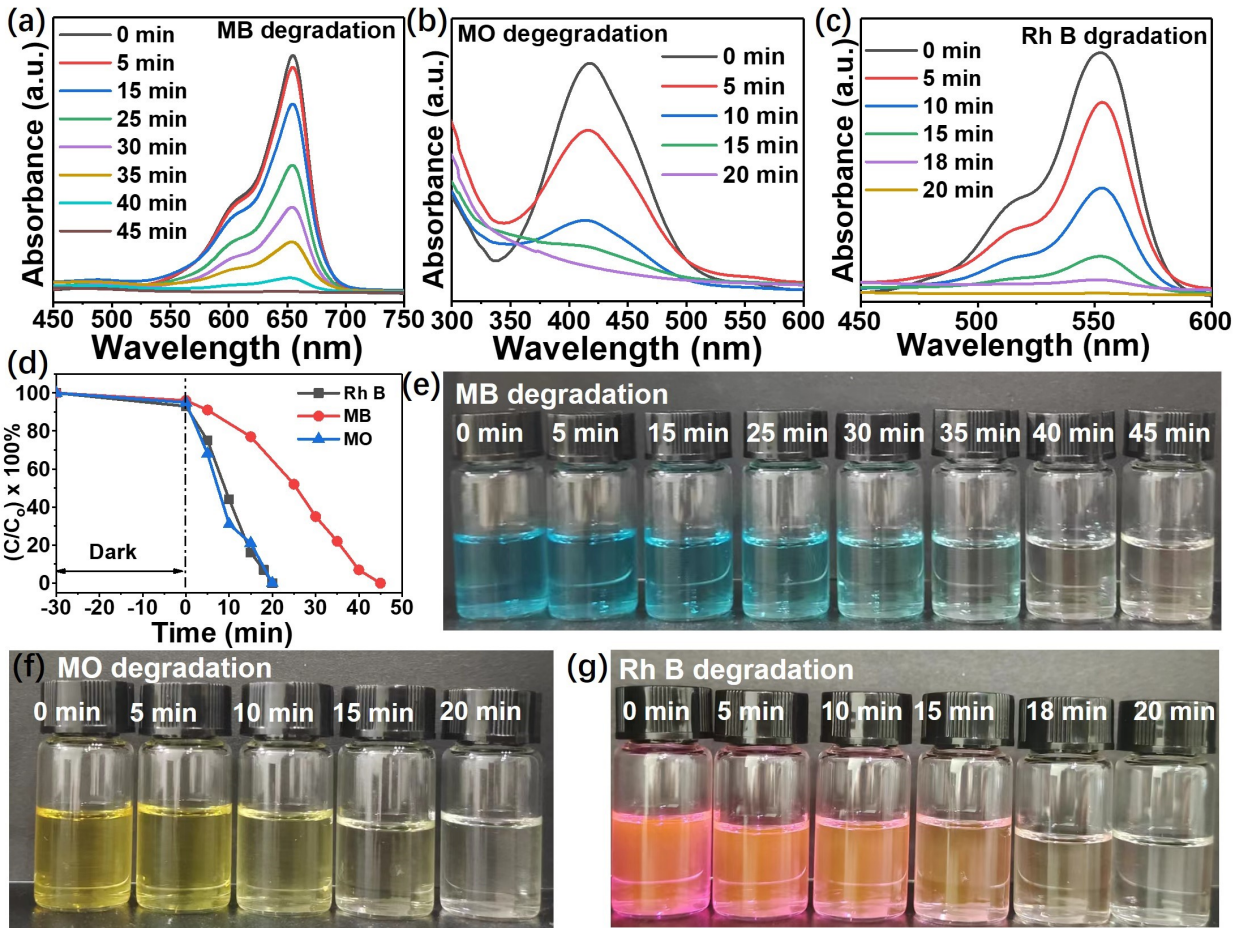


**Fig. S13** (a-c) Evolution of the UV-vis absorption spectra of MB (a), MO (b) and RhB (c) during photocatalytic degradation in the presence of Ag-doped CNBC sample. (d-f) The digital photographs of the corresponding dye solutions as-dictated in each panel, during photocatalytic degradation in the presence of Ag-doped CNBC sample.

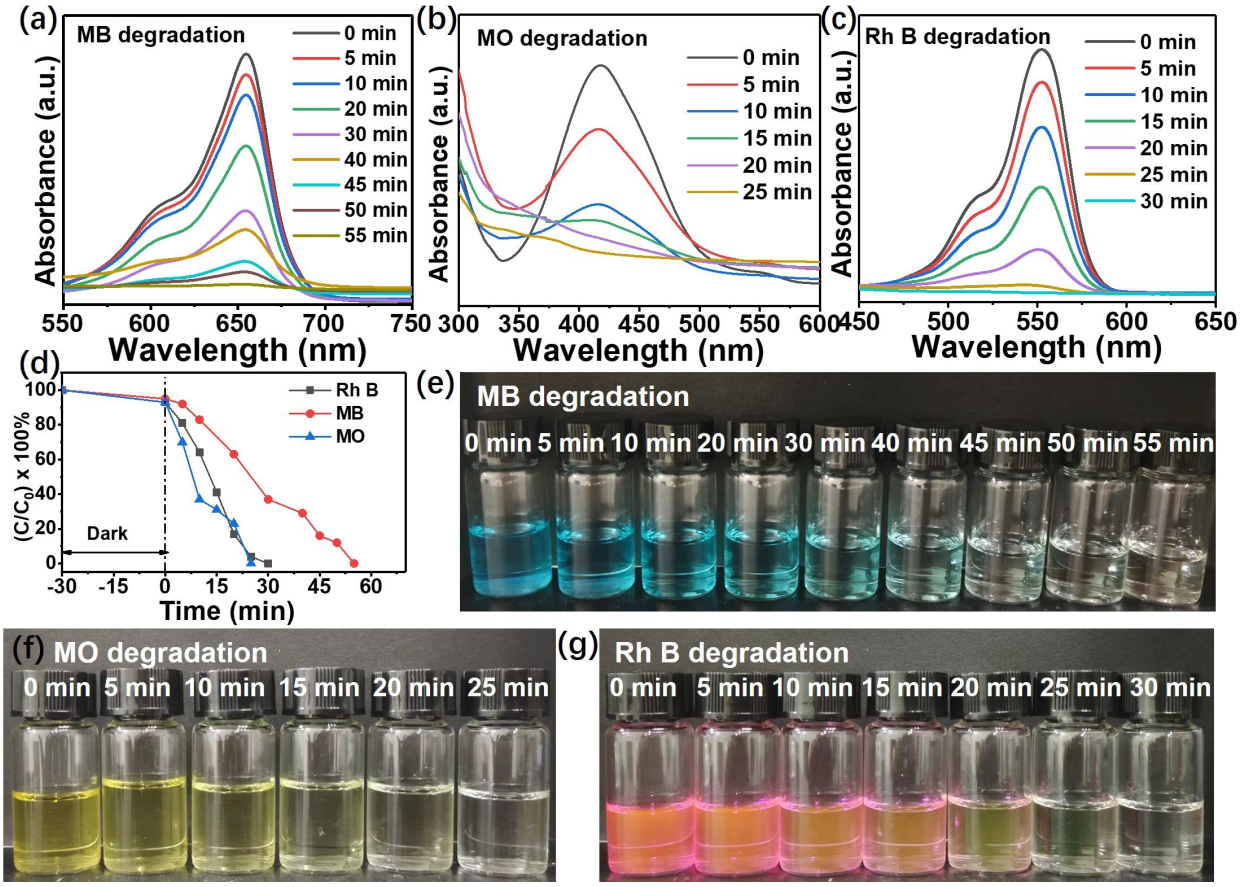


**Fig. S14** (a-c) Evolution of the UV-vis absorption spectra of MB (a), MO (b) and RhB (c) during photocatalytic degradation in the presence of Mn-doped CNBC sample. (d-f) The digital photographs of the corresponding dye solutions as-dictated in each panel, during photocatalytic degradation in the presence of Ag-doped CNBC sample.